Page 1 of 3

Printed Page:- 03

Time: 3 Hours

General Instructions:

IMP: Verify that you have received the question paper with the correct course, code, branch etc.

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA (An Autonomous Institute Affiliated to AKTU, Lucknow) M.Tech

> SEM: II - THEORY EXAMINATION (2023 - 2024) Subject: Hybrid Vehicle Technology

1. This Question paper comprises of **three Sections -A, B, & C.** It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.

2. *Maximum marks for each question are indicated on right -hand side of each question.*

- **3.** Illustrate your answers with neat sketches wherever necessary.
- **4.** Assume suitable data if necessary.
- **5.** *Preferably, write the answers in sequential order.*

6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION A

1. Attempt all parts:-

- 1-a. Regenerative braking involves: (CO1)
 - (a) nanofibers that repair the surface of brake pads
 - (b) reducing the amount of friction necessary to slow a car
 - (c) reclaiming heat from the brakes and using it for power
 - (d) none of the above
- 1-b. Which of the following machine will be preferred to charge the batteries? (CO2) 1
 - (a) Series generator
 - (b) Series motor
 - (c) Shunt generator
 - (d) Compound generator
- 1-c. When the plate area of a capacitor increases, (CO3)
 - (a) the capacitance is unaffected
 - (b) the capacitance decreases
 - (c) the voltage it can withstand increases.

Max. Marks: 70

15

1

1

Subject Code:- AMTME0222

Roll. No:

(d) the capacitance increases.

1-d. The conventional master cylinder and booster assembly is being replaced by. 1 (CO4)

1

- (a) Actuator Control Unit (ACU)
- (b) Hydraulic Electronic Control Unit (HECU)
- (c) Electronic Stability Program (ESP)
- (d) none of the above

1-e. Maximum demand charges are given in (CO5)

- (a) kWh
- (b) kVA
- (c) kVAr
- (d) All of these

2. Attempt all parts:-

- 2024 2 2.a. Define the term King pin inclination. (CO1) 2.b. What is a commutator? (CO2) 2 2.c. Write short note on Lithium-Ion battery. (CO3) 2 Define Constant Power Speed Ratio (CPSR). (CO4) 2.d. 2 What is state of health in battery? (CO5) 2.e. 2 **SECTION B** 20 3. Answer any five of the following:-What is idle start/stop? (CO1) 3-a. 4 3-b. What is recuperation? (CO1) 4 What are the factors affecting energy consumption? (CO2) 3-c. 4 3-d. Name the advanced methods of speed control of traction motors. (CO2) 4 3.e. Discuss the performance of super capacitor in electric vehicle. (CO3) 4 3.f. Explain CAN and LIN. (CO4) 4 Explain the meaning of Fuel and Energy substitution with examples. (CO5) 3.q. 4 SECTION C 35 4. Answer any one of the following:-Describe working of torque converter. (CO1) 4-a. 7 4-b. 7 What is Turbocharger? Explain in detail. (CO1)
- 5. Answer any one of the following:-

5-a.	Explain the operation of permanent magnet motors in detail? (CO2)	7
5-b.	Explain the working principle of 3 phase motor. With what material the rotor of 3 phase motor is made? (CO2)	7
6. Answer any <u>one</u> of the following:-		
6-a.	Explain in detail the operational principle of Flywheel. (CO3)	7
6-b.	Discuss about the technologies used in ultra capacitors. (CO3)	7
7. Answer any <u>one</u> of the following:-		
7-a.	In the supporting subsystems explain the steering system. (CO4)	7
7-b.	In the supporting subsystems explain the braking system. (CO4)	7
8. Answer any <u>one</u> of the following:-		
8-a.	Explain the common battery types, their basic components with adavantages and disadvantages. (CO5)	7
8-b.	Write a short note on: Hydrogen Cell. (CO5)	7